

TWO COLLECTIONS OF PREHISTORIC CORN TASSELS FROM SOUTHERN UTAH

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The extreme variability of *Zea Mays*, while discouraging to the novice, will make collections of prehistoric maize particularly significant when this variability is at length understood and catalogued. In this connection, it is unfortunate that more well-preserved male inflorescences (corn tassels in common speech) are not represented in archeological collections. While they do not present as many diagnostic features as the female inflorescence (the ear) they are by no means to be despised, particularly since their variation is comparatively easy to measure objectively and exactly. The following account has been prepared partly as a demonstration and partly because these particular collections present features of general interest. Both are from expeditions organized by the Peabody Museum of Harvard University. I am indebted to Dr. J. O. Brew for the opportunity of studying this interesting material and for much pertinent information.

The two collections are roughly contemporaneous and according to current archeological practice in the Southwest would be dated at about 1000 A. D.¹ (see caption fig. 3 for exact citations). One collection consisted of twelve more-or-less perfect tassels from Floating House Ruin on the Arizona-Utah border. The other came from a small cave at Alkali Ridge in southeastern Utah. As illustrated in plate 18, it consists of ten bunches of tassels neatly tied together with a strong withe, apparently of willow bark. The tassels are all just barely ripe; the anthers are developed and little or no pollen had yet been shed. All are neatly laid side by side, pointing the same way. All were either originally trimmed or have subsequently been broken. To a student of maize the most interesting feature of the collection is its comparative uniformity for technical characters, indicating a careful selection of seed stocks on the part of those who grew it. The plant-to-plant variation is no more than is found in such highly selected modern varieties of maize as Golden Bantam sweet corn or the white flour corn of the Hopi. It might be argued that the uniformity is merely a reflection of the innate lack of variability in a widespread primitive variety. On the contrary, such studies of plant-to-plant variation as have been made with Basket Maker maize² indicate that it was high.

After the collections had been photographed, the tassels were moistened to make them less brittle and the more-or-less complete tassels were then scored for

¹ Those unfamiliar with the archeology of the American Southwest will find useful summaries in: Roberts, Frank H. *Am. Anthrop. n. s.* 37:1-35. 1935; and Bryan, Kirk. *Ann. Assoc. Am. Geog.* 31:2; 9-226. 1941.

² Anderson, Edgar, and F. D. Blanchard. *Am. Jour. Bot.* 29:832-835. 1942.

as many significant features as possible. While to the casual observer the male inflorescence of maize is so featureless as to be of no special interest, it is actually a complicated organ with a very definite ground-plan. The outstanding features are diagrammed in fig. 1, and a complete scoring of the tassel illustrated in plate 19 is presented in text-fig. 2. The maize tassel is built upon a primary axis terminated by the CENTRAL SPIKE (A, fig. 1), along which the spikelets are arranged in many rows (in some South American varieties they are in whorls of 3 or more). Below the central spike are the SECONDARY BRANCHES 'B', 'F', 'G' whose number varies greatly in different races of maize. The lowermost secondaries may bear TERTIARY BRANCHES 'C', and in some South American varieties these may even produce branches of the fourth order. The secondaries may arise

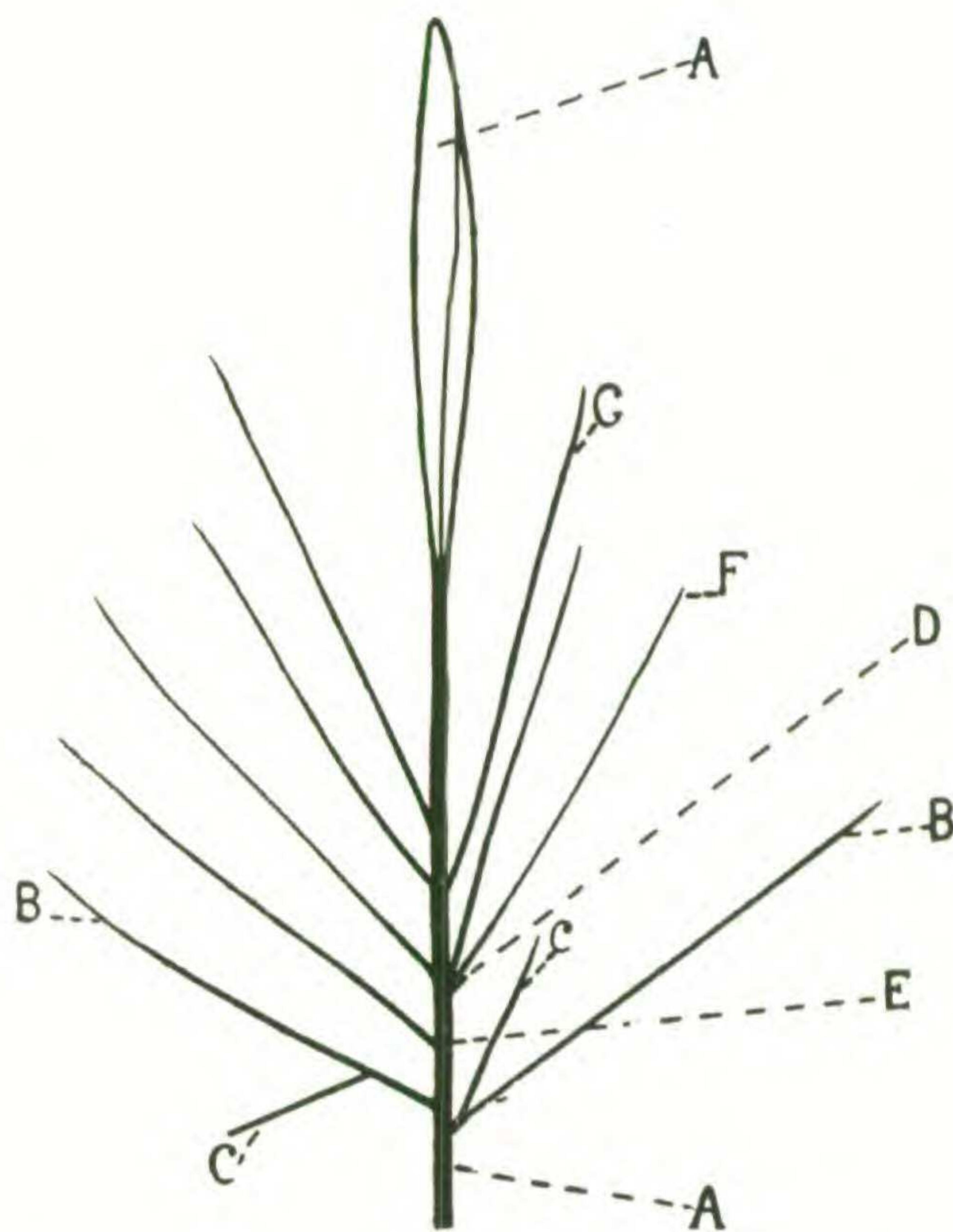


Fig. 1. Diagram showing main features of the male inflorescence (tassel) of *Zea Mays*, with particular reference to the usual type in North America. Further explanation in text.

singly from the main axis or may be in WHORLS (D) of two or more. On the secondaries the SPIKELETS are arranged in pairs, though, as will be shown below, there are departures from this regular arrangement in North American maize. In each pair one spikelet is ordinarily pedicellate and one is sessile, but in North America the pedicellate spikelet may be so sessile as to be indistinguishable from its neighbor. In South American maize the secondaries often have a long sterile zone at the base of the secondary branches which is without spikelets. In the Southwest and in Mexico this zone is short or is lacking altogether. The

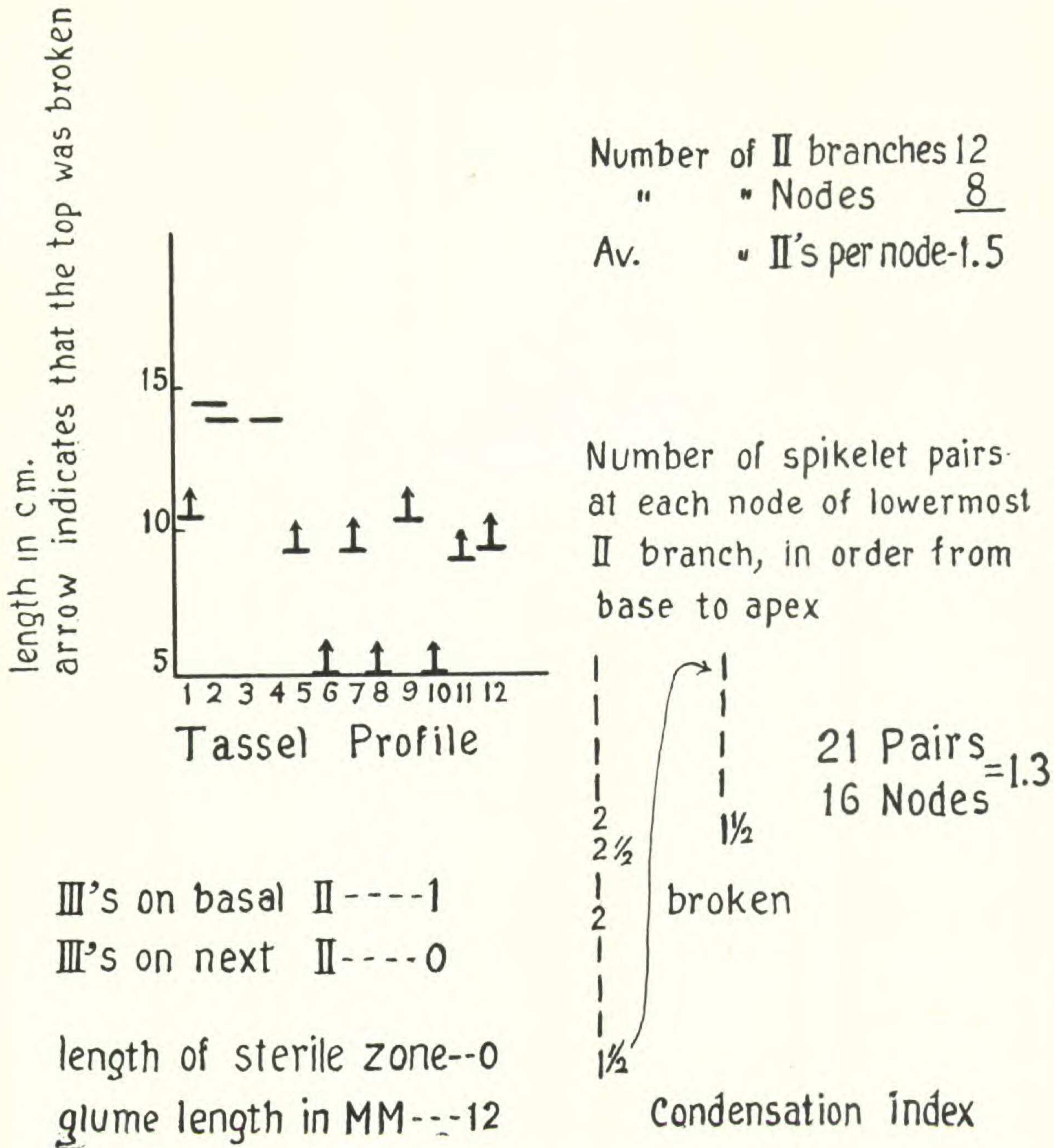


Fig. 2. Score sheet for the actual tassel illustrated in plate 19. Further explanation in text and in Anderson, Ann. Mo. Bot. Gard. 31:325-342. 1944.

length of the spikelets varies between different races of maize, and many of the southwestern varieties have *glumes* (the main feature of the spikelets) which are 12-15 mm. long.

As has recently been demonstrated³, all North American dent corns show a greater or lesser amount of *condensed* or telescoped internodes in their tassels, and this same condensation (a kind of controlled fasciation) is one of the factors responsible for the higher row number on the ears of these varieties. However this condition may have arisen, it is strongly centered geographically about the Mexico City-Toluca region. Condensed internodes in the tassel of a North

³ Anderson, Edgar. Ann. Mo. Bot. Gard. 31:325-342. 1944.

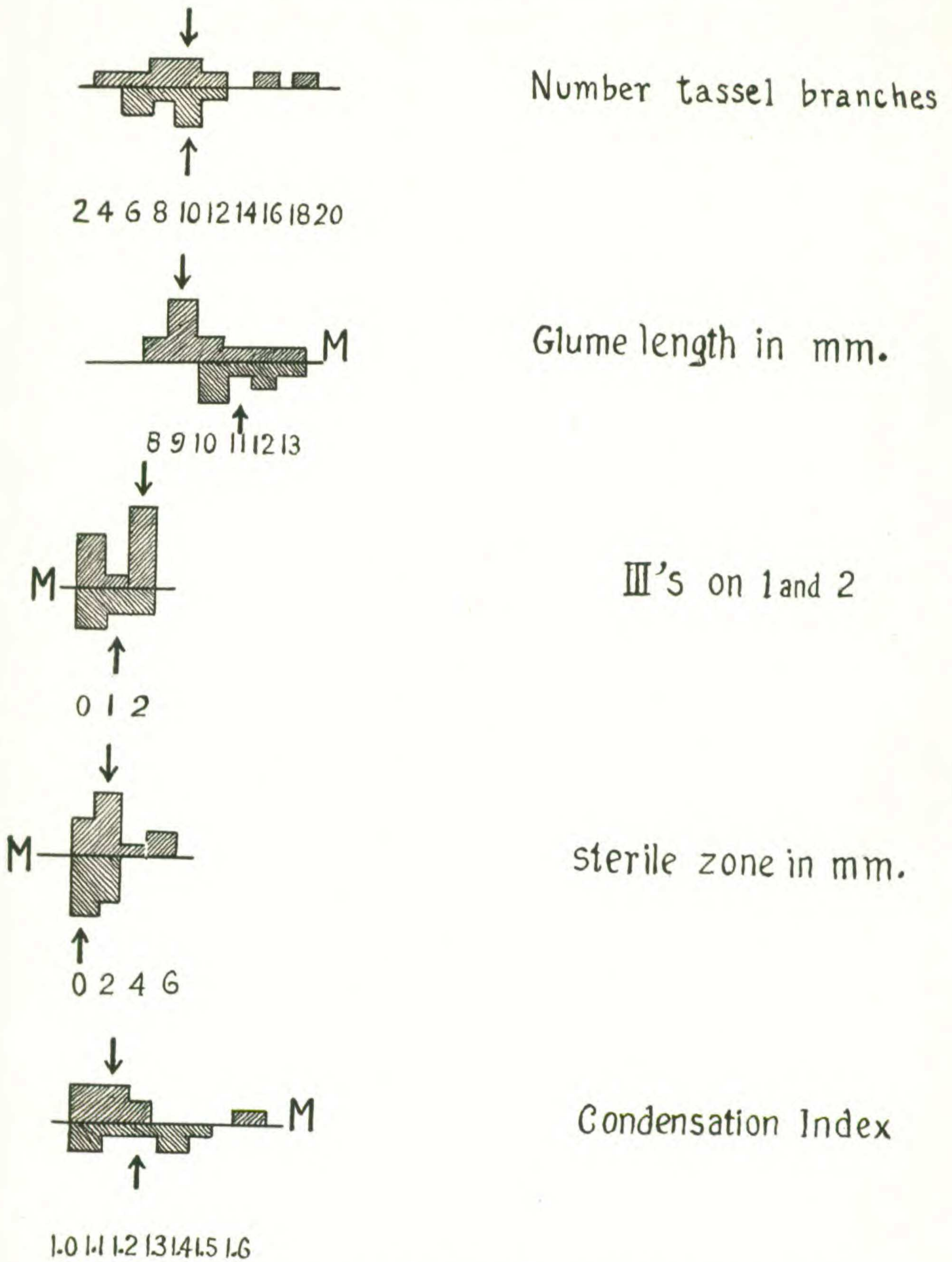


Fig. 3. Frequency distributions for five tassel characters for two prehistoric collections. The two are diagrammed from the same base line: upwards, frequencies for the collection from Floating House Ruin, Peabody Museum, No. 33-62-10/2118 (Room 2A above floor A); downwards, frequencies for the collection from Alkali Ridge, Peabody Museum, No. 33-44-10/3572 (small cave 1/4 mi. from site Ab 7-13, Peabody Museum, Southeastern Utah Expedition). "M" represents the direction in which Mexico City tassels would score. Though the two frequencies are similar, the lower set (Alkali Ridge) is slightly more Mexican-like.

American variety of maize therefore imply a connection of some kind with the maize of that area, since high condensation seems to be too complex genetically to have arisen repeatedly. An exact method of scoring this condensation has recently been described³, and the Condensation Index derived from the tassel permits a fairly accurate estimate of the row number of the ear in North American varieties. The *Condensation Index* is calculated as shown in fig. 2. It is the average number of spikelet pairs per apparent node on the lowest secondary branch (see Anderson, *loc. cit.* for further details). After the Condensation Index the next most significant fact concerning the male inflorescence is the *tassel profile*. This is merely a diagram like the one illustrated in fig. 2. It shows the length of successive secondary branches in order from the base to the apex. In general, it is closely correlated with the size and shape of the ear³. In fig. 2, unbroken secondaries are indicated in the profile diagram by a bar, and broken secondaries by a bar with an arrow.

Frequency diagrams for the two collections are shown in fig. 3, the frequencies for *Floating House* being diagrammed upwards and those for *Alkali Ridge* downwards, from a common base line. The arrows indicate the averages (medians) for each of the five characters. There is no difference in the two averages for tassel branch number; for the other four characters there are slight differences. These are scarcely significant statistically, being based upon such small numbers, but biologically they may mean something since they are all in the same direction. For all four characters the Alkali Ridge collection differs from the Floating House series by being slightly more like the maize of the Mexico City-Toluca region. This well-marked geographical type (Mexican Pyramidal of Anderson and Cutler) has long glumes, few tertiaries, an extremely short sterile zone and a very high condensation index. Since the slight differences of the Alkali Ridge collections are longer glumes, slightly fewer tertiaries, a shorter sterile zone and a slightly higher Condensation Index, it seems probable that the Alkali Ridge maize in fact was slightly more Mexican-like than that from Floating House. The difference, if it really existed, was not at all extreme and no more than might be found to-day between the same variety of maize grown in two different Mexican villages.

It is not surprising to find that the maize from the two sites is so similar. They are not far apart in space and were apparently closely contemporaneous. This section of Floating House may be dated as belonging to Pueblo II or Pueblo III, and the Alkali Ridge material as Pueblo I or II. This means that the two sets are within a few hundred years of each other at the most and around 1000 A. D., according to the most widely accepted chronology for the Southwest. Bryan⁴ summarizes current opinions on southwestern chronology as follows:

"Pueblo V	1600
Pueblo IV	1300-1600
Pueblo III	1100-1300
Pueblo II	900-1100
Pueblo I	700- 900
Basketmaker III	500- 700

³ Anderson, *loc. cit.*

⁴ Ann. Assoc. Am. Geogr. 31:p. 9.

Basketmaker II ? - 500
 Basketmaker I postulated

Various authorities use slightly different dates, and some question the reality of the boundaries between some of the categories."

The evidence reported above will have greater significance when it can be seen against a background of exact comparisons with various prehistoric and modern collections from the same general area. However, it is in harmony with such facts as have already emerged. The few-rowed primitive flints of the early Basket Makers were apparently gradually tempered by many-rowed Mexican dents which diffused into the "fourcorners" region, *apparently from the north*. (The most extremely "Mexican" collections we have yet seen are those of Scoggins from Yampa Canyon, Colorado, which grade into a group from northern Utah, and the two tassel series described here show even further dilutions of the Mexican influence.) At a later date (1200-1300 A. D.) southwestern maize changed suddenly and radically when long-eared, crescent-seeded types spread into the region, apparently, either directly or indirectly, from the eastern United States⁵.

SUMMARY

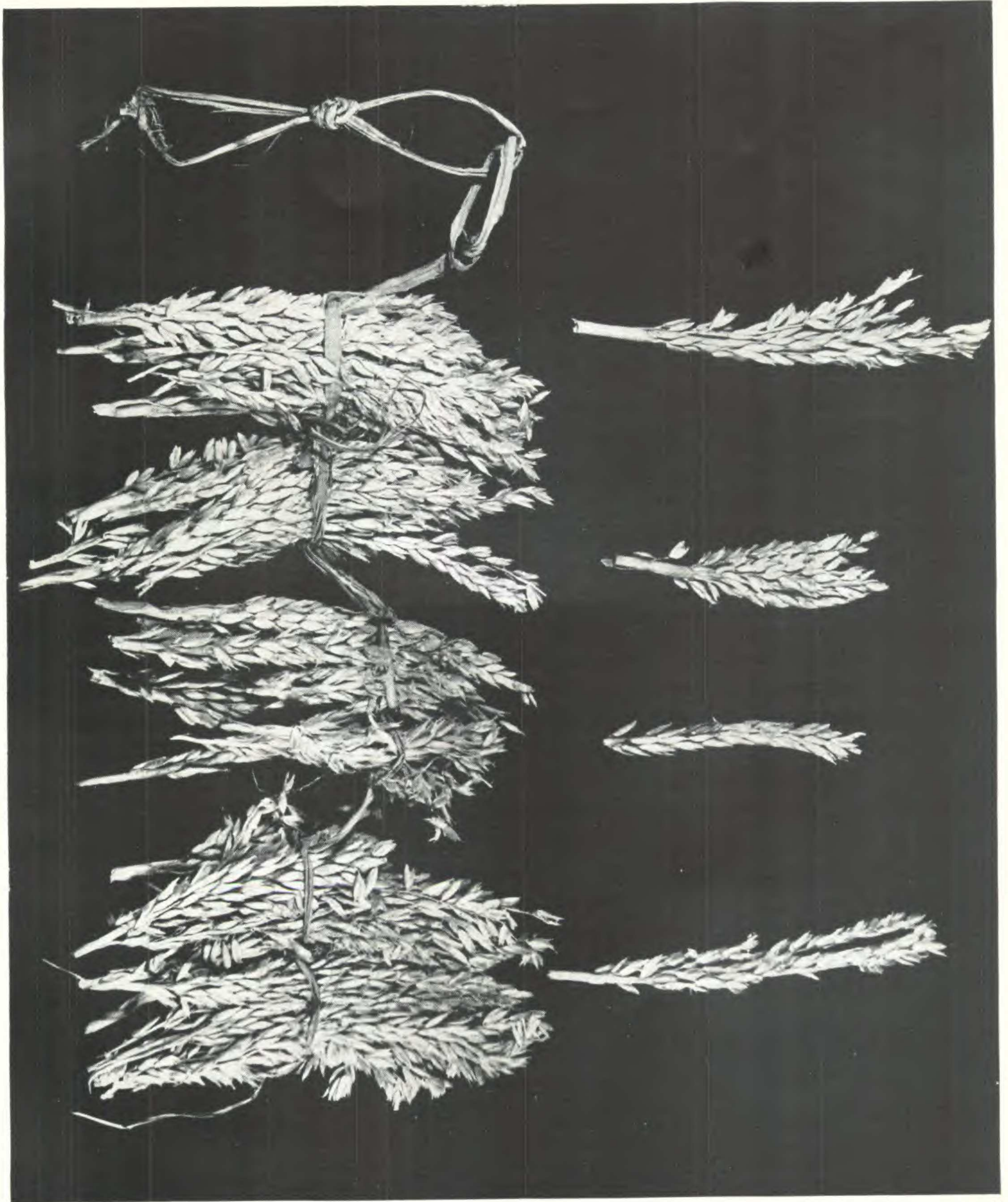
1. The importance of preserving tassels, as well as the ears, of prehistoric maize is illustrated by two collections from the Peabody Museum.
2. The chief features of a maize tassel are enumerated and methods of scoring the variation exactly are described and illustrated.
3. The tassels from Alkali Ridge were tied together with bark and had apparently been prepared for ceremonial use.
4. The two collections are very similar, the one from Alkali Ridge being slightly more Mexican in its technical characteristics. Both series have such slight plant-to-plant variation as to imply a high grade of agronomic skill on the part of their cultivators.
5. The collections are discussed briefly with reference to what is now known of the history of maize in the Southwest.

⁵ Carter, George F., and Edgar Anderson. Paper in press.

EXPLANATION OF PLATE

PLATE 18

Pre-Columbian tassels from Alkali Ridge, Utah. Peabody Museum, No. 33-44-10/3572. Photograph courtesy of the Peabody Museum, Harvard University.



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EXPLANATION OF PLATE

PLATE 19

Tassel and tassel fragments from the band shown in pl. 18: Right: One of the most perfect tassels from the collection, this is scored in detail in text-fig. 2. Left: Fragments from two tassel branches; the upper contains no condensed internodes and the pedicellate spikelets are clearly shown; the lower fragment has sessile spikelets and a few condensed internodes.

Photograph courtesy of the Peabody Museum, Harvard University.



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